[73] **WE CLAIM:**

1. A reliable symbol identification method comprising:

calculating a reliability factor of a candidate sample from values of a plurality of samples in proximity to the candidate sample,

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol.

2. The method of claim 1, wherein the reliability factor R_n of the candidate sample is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} |y_{n-i}| \cdot c_i \text{ , where}$$

y_n is the candidate sample,

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

3. The method of claim 2, where $c_i = 1$ for all i.

4. The method of claim 2, wherein $K_1 = 0$.

5. The method of claim 2, wherein $K_2 = 0$.

6. The method of claim 1, wherein the predetermined threshold varies over time.

7. The method of claim 1, further comprising determining a rate at which reliable symbols are identified, and

if the rate is less than a predetermined value, increasing the predetermined threshold.

8. The method of claim 1, further comprising determining a rate at which reliable symbols are identified, and

if the rate exceeds a second predetermined value, decreasing the predetermined threshold.

9. The method of claim 1, wherein the reliability of a two-dimensional candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} \sqrt{y_{1_{n-i}}^2 + y_{2_{n-i}}^2} \cdot c_i \text{ , where}$$

$y_{1_{n-i}}^2$ and $y_{2_{n-i}}^2$ respectively represent values of a neighboring sample y_{n-i} in first and second dimensions,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

10. A method of identifying reliable symbols, comprising, for a candidate sample y_n:

iteratively, for $i= -K_1$ to K_2, $i \neq 0$:

adding to a reliability factor based on a value of the sample y_{n-i},

if the reliability factor exceeds a predetermined limit, disqualifying the candidate sample as a reliable symbol, and

otherwise, incrementing i and, if i=0, re-incrementing i for a subsequent iteration;

thereafter, unless the candidate symbol has been disqualified, designating the candidate sample as a reliable symbol.

11. The method of claim 11, wherein the adding adds an absolute value of the sample y_{n-i} to the reliability factor.

12. The method of claim 11, wherein the adding adds a scaled value of the sample y_{n-i} to the reliability factor, the value scaled in accordance with a predetermined coefficient c_i.

13. The method of claim 11, wherein the adding adds the power of the sample y_{n-i} to the reliability factor.

14. The method of claim 13, wherein the predetermined limit is half a width of an annular constellation ring in which the candidate sample is observed.

15. The method of claim 11, the predetermined limit is $(K_1 + K_2)d_{min}$ where d_{min} is half a distance between two constellation points that are closest together in a governing constellation.

16. The method of claim 11, wherein the predetermined limit varies over time.

17. The method of claim 11, further comprising determining a rate at which reliable symbols are identified, and

if the rate is less than a predetermined value, increasing the predetermined limit.

18. The method of claim 11, further comprising determining a rate at which reliable symbols are identified, and

if the rate exceeds a second predetermined value, decreasing the predetermined limit.

19. A method of identifying reliable symbols, comprising, for a candidate sample,

determining whether any of a plurality of neighboring sample values is within a predetermined limit,

if none of the values exceed the threshold, designating the candidate sample as a reliable symbol.

20. The method of claim 19, wherein the predetermined limit varies over time.

21. The method of claim 19, further comprising determining a rate at which reliable symbols are identified,

if the rate is less than a predetermined threshold, increasing the predetermined limit.

22. The method of claim 21, further comprising, if the rate exceeds a second predetermined threshold, decreasing the predetermined limit.

23. The method of claim 19, wherein the neighboring samples occur in a first window adjacent to the candidate sample on one side of the candidate sample.

24. The method of claim 19, wherein the neighboring symbols occur in a pair of windows that are adjacent to, and on either side of the candidate sample.

25. A reliable symbol detection method, comprising:

identifying a sequence of signal values having values within a predetermined limit, and

designating a sample adjacent to the sequence as a reliable symbol.

26. The method of claim 25, wherein the predetermined limit varies over time.

27. The method of claim 25, further comprising determining a rate at which reliable symbols are identified,

if the rate is less than a predetermined threshold, increasing the predetermined limit.

28. The method of claim 27, further comprising, if the rate exceeds a second predetermined threshold, decreasing the predetermined limit.

29. A data decoder comprising:

a reliable symbol detector to detect reliable symbols from a sequence of captured samples, the captured samples having been corrupted by at least intersymbol interference ("ISI"),

an adaptation unit coupled to the reliable symbol detector to generate ISI metrics based on the reliable symbols, and

a data decoder to receive the captured samples and estimate source symbols based on the ISI metrics.

30. An equalization method, comprising

identifying reliable symbols from a string of captured samples,

calculating channel effects based on the reliable symbols and samples adjacent thereto,

correcting the captured samples based on the channel effects.

31. The method of claim 30, wherein the identifying comprises:

calculating a reliability factor of a candidate sample from values of a plurality of samples in the neighborhood of the candidate sample,

if the reliability factor is below a predetermined limit, designating the candidate sample as a reliable symbol.

32. The method of claim 31, wherein the reliability factor of the candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i\neq 0}}^{K_2} |y_{n-i}| \cdot c_i \text{ , where}$$

y_{n-i} is a sample in the neighborhood of the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

33. The method of claim 31, wherein the reliability factor of the candidate sample y_n is given by:

$$R_n = \sum_{i=1}^{K} |y_{n-i}| \cdot c_i \text{ , where}$$

y_{n-i} is a sample in the neighborhood of the candidate sample,

K is a length of samples, and

c_i is a coefficient.

34. The method of claim 31, wherein the reliability of a two-dimensional candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i\neq 0}}^{K_2} \sqrt{y_{1_{n-i}}^2 + y_{2_{n-i}}^2} \cdot c_i \text{ , where}$$

$y_{1_{n-i}}^2$ and $y_{2_{n-i}}^2$ respectively represent values of a neighboring sample y_{n-i} in first and second dimensions,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

35. The method of claim 30, wherein the identifying comprises:

identifying a sequence of samples having received signal magnitude levels below a predetermined limit, and

designating a sample adjacent to the sequence as a reliable symbol.

36. The method of claim 30, wherein, for QAM transmission, the identifying comprises:

identifying a sequence of samples for which a received signal magnitude in a quadrature-phase component is below a predetermined limit, and

designating an adjacent sample as a reliable symbol for quadrature-phase.

37. The method of claim 30, wherein, for QAM transmission, the identifying comprises:

identifying a sequence of samples for which a received signal magnitude in an in-phase component is below a predetermined limit, and

designating an adjacent sample as a reliable symbol for in-phase.

38. The method of claim 30, wherein the calculating estimates K channel coefficients a_i according to a least squared error analysis of $y_{RS} - \hat{x}_n - \sum_{i=1}^{K} \hat{a}_i \hat{x}_{n-i}$, solving for $\hat{a}_i$, for a plurality of reliable symbols y_{RS}, where $\hat{x}_n$ and $\hat{x}_{n-i}$ are estimated transmitted symbols.

39. The method of claim 30, further comprising assigning weights among the reliable symbols based upon respective reliability factors.

40. An equalizer, comprising:

a buffer memory,

a reliable symbol detector in communication with the buffer memory,

an adaptation unit in communication with the reliable symbol detector, and

a symbol decoder in communication with the adaptation unit and the buffer memory.

41. The equalizer of claim 40, wherein the reliable symbol operates according to a method, comprising:

calculating a reliability factor of a candidate sample from values of a plurality of samples proximate to the candidate sample, and

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol.

42. The equalizer of claim 41, wherein the reliability factor R_n of the candidate sample is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i\neq 0}}^{K_2} |y_{n-i}| \cdot c_i \text{ , where}$$

y_n is the candidate sample,

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

43. The equalizer of claim 41, wherein the reliability of a two-dimensional candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i\neq 0}}^{K_2} \sqrt{y_{1_{n-i}}^2 + y_{2_{n-i}}^2} \cdot c_i \text{ , where}$$

$y_{1_{n-i}}^2$ and $y_{2_{n-i}}^2$ respectively represent values of a neighboring sample y_{n-i} in first and second dimensions,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

44. A receiver, comprising:

a demodulator,

a buffer memory in communication with the demodulator,

a processor in communication with the demodulator, executing instructions that establish the following logical structures therein:

a reliable symbol detector in communication with the buffer memory,

an adaptation unit in communication with the reliable symbol detector, and

a symbol decoder unit in communication with the adaptation unit and the buffer memory, and

a source decoder in communication with the equalizer.

45. The receiver of claim 44, wherein the reliable symbol operates according to a method, comprising:

calculating a reliability factor of a candidate sample from values of a plurality of samples proximate to the candidate sample, and

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol.

46. The receiver of claim 45, wherein the reliability factor R_n of the candidate sample is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} |y_{n-i}| \cdot c_i \text{ , where}$$

y_n is the candidate sample,

$y_{n\text{-}i}$ is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

47. The receiver of claim 45, wherein the reliability of a two-dimensional candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} \sqrt{y_{1_{n-i}}^2 + y_{2_{n-i}}^2} \cdot c_i \text{ , where}$$

$y_{1_{n-i}}^2$ and $y_{2_{n-i}}^2$ respectively represent values of a neighboring sample $y_{n\text{-}i}$ in first and second dimensions,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

48. The receiver of claim 44, further comprising a second buffer memory in communication with the symbol decoder.

49. A transmission system comprising:

a source that transmits data encoded as symbols, the symbols being selected from a high-order constellation,

a destination that captures a signal representing the transmitted symbols having been corrupted by at least intersymbol interference, the destination:

identifying reliable symbols from the captured samples,

calculating channel effects based on the reliable symbols and samples proximate thereto,

correcting other captured samples based on the channel effects.

50. The method of claim 49, wherein reliable symbols are identified according to a method comprising:

calculating a reliability factor of a candidate sample from values of a plurality of samples proximate to the candidate sample, and

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol.

51. The method of claim 50, wherein the reliability factor R_n of the candidate sample is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} |y_{n-i}| \cdot c_i \text{, where}$$

y_n is the candidate sample,

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

52. The method of claim 50, wherein the reliability of a two-dimensional candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} \sqrt{y_{1_{n-i}}^2 + y_{2_{n-i}}^2} \cdot c_i \text{, where}$$

$y^2_{1_{n-i}}$ and $y^2_{2_{n-i}}$ respectively represent values of a neighboring sample y_{n-i} in first and second dimensions,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

53. A computer readable medium having stored thereon instructions that, when executed, cause a processor to:

calculate a reliability factor of a candidate sample from values of a plurality of samples proximate to the candidate sample, and

if the reliability factor is less than a predetermined limit, designate the candidate sample as a reliable symbol.

54. The method of claim 53, wherein the reliability factor R_n of the candidate sample is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} |y_{n-i}| \cdot c_i \text{, where}$$

y_n is the candidate sample,

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

55. The method of claim 53, wherein the reliability of a two-dimensional candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i \neq 0}}^{K_2} \sqrt{y^2_{1_{n-i}} + y^2_{2_{n-i}}} \cdot c_i \text{, where}$$

$y^2_{1_{n-i}}$ and $y^2_{2_{n-i}}$ respectively represent values of a neighboring sample y_{n-i} in first and second dimensions,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

56. A computer readable medium having stored thereon instructions that, when executed, cause a processor to:

identify reliable symbols from a string of captured samples,

calculate channel effects based on the reliable symbols and samples proximate thereto,

correct the captured samples based on the channel effects.

57. A data signal, generated according to the process of:

identifying reliable symbols from a string of captured samples,

calculating channel effects based on the reliable symbols and samples proximate thereto,

estimating transmitted symbols from remaining captured samples based on the channel effects, and

outputting the estimated symbols as the data signal.